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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/473,394	12/28/1999	KAIZAD R. MISTRY	042390.P6892	9930

7590 12/15/2004
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EXAMINER

KANG, DONGHEE

ART UNIT PAPER NUMBER

2811

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/473,394	Applicant(s) MISTRY, KAIZAD R.	
	Examiner Donghee Kang	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-9 is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims **4-6** are rejected under 35 U.S.C. 102(a) as being anticipated by Gardner et al. (US 5,918,134).

Regarding claim **4**, Gardner et al. disclose a field effect transistor, comprising (Fig.10):

a substrate (102) having a recess in a surface thereof; the recess having a bottom portion and tapered sidewalls, the tapered sidewall surface forming an obtuse angle with respect to the bottom portions of the recess; a gate dielectric layer (132) disposed superjacent the bottom portion of the recess and adjacent the tapered sidewalls, and superjacent a portion of a top surface of the substrate; a gate electrode (134) completely overlying the gate dielectric layer; and source/drain terminals (140a) disposed in the substrate in alignment with a pair of laterally opposed gate electrode sidewalls; wherein the source/drain terminals comprises an extension (130) which extends to a more shallow depth within the substrate than the source/drain terminals to which it corresponds and extends downwardly, from approximately the surface of the substrate, along the sidewalls of the recess, an entire innermost side of the extension is

adjacent to sidewalls of the recess, and wherein the extension extends to approximately a junction of the tapered sidewalls and the bottom of recess.

The word "approximately" is a broad term, which means located close together (Merriam-Webster's Collegiate Dictionary). Figure 10 clearly shows that the extension extends to approximately a junction of the tapered sidewalls and the bottom of recess.

Regarding claim 5, Gardner et al. disclose that a portion of the gate electrode overlies an innermost portion of extension.

Regarding claim 6, Gardner et al. discloses that the gate electrode conforms to a recessed channel.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US 6,303,448) in view of Jeuch et al. (US 4,939,100)

Regarding claim 1, Chang et al. disclose a field effect transistor, comprising (Fig.6):

a substrate (10) having a recess in a surface thereof; the recess having a bottom portion and substantially vertical sidewalls; a gate dielectric layer (62) disposed superjacent the bottom portion of the recess and adjacent the substantially vertical sidewalls; a gate electrode (64A) completely overlying the gate dielectric layer; and

source/drain terminals (70) disposed in the substrate in alignment with a pair of laterally opposed gate electrode sidewalls, said gate electrode extending to a less shallow depth within said substrate than a depth at which the source/drain terminals are disposed; wherein the source/drain terminals comprises an extension (LDD,66) which extends to a more shallow depth within the substrate than the source/drain terminals to which it corresponds and extends downwardly, from approximately the surface of the substrate, along the sidewalls of the recess, an entire innermost side of the extension is adjacent to the vertical sidewalls of the recess, and wherein the extension extends to approximately a junction of the vertical sidewalls and the bottom portion of the recess.

The word "approximately" is a broad term, which means located close together (Merriam-Webster's Collegiate Dictionary). Figure 6 clearly shows that the extension extends to approximately a junction of the vertical sidewalls and the bottom portion of the recess.

Chang et al. do not teach the gate dielectric layer disposed superjacent a portion of a top surface of the substrate. Jeuch et al. teach in Fig. 5I the gate dielectric layer (56) disposed superjacent the bottom portion of the recess and superjacent a portion of a top surface of the substrate to reduce an electric field (Col.5, lines 53-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Jeuch into the Chang's device in order to reduce the electric field.

Regarding claim 2, Chang et al. disclose the transistor further comprising a portion of the gate electrode that overlies the innermost portion of the extension.

Regarding claim 3, Chang et al. disclose that the gate electrode conforms to a recessed channel.

Allowable Subject Matter

5. Claims 7-9 are allowed.

Response to Arguments

6. Applicant's arguments filed 10-15-04 have been fully considered but they are not persuasive.

Applicant argues that Gardner does not disclose new added limitation such as "an extension of the source/drain terminals extends to approximately a junction of the tapered sidewalls and the bottom portion of the recess. This is not convincing. The word "approximately" is a broad term, which means located close together (Merriam-Webster's Collegiate Dictionary). Gardner clearly teaches this limitation.

Applicant argues that Chang does not teach newly added limitation such as "the extension extends to approximately a junction of the vertical sidewalls and the bottom portion of the recess". This is not convincing because of same reason explained above.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 571-272-1656. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Donghee Kang
Primary Examiner
Art Unit 2811

dhk